

ANIONIC END-CAPPED OLIGOMERIC ESTERS AS SOIL RELEASE AGENTS IN DETERGENT COMPOSITIONS

TECHNICAL FIELD

The present invention relates to particular oligomeric esters having anionic capping groups, useful as soil release agents in consumer laundering and fabric care compositions. In their fabric care aspects, modern versions of such compositions address consumer needs in fields which include fabric softening and the provision of antistatic or soil release properties to synthetic fabrics.

BACKGROUND OF THE INVENTION

A substantial proportion of synthetic fabrics now in use are copolymers of ethylene glycol and terephthalic acid, sold under trade names which include Dacron, Fortrel, Kodel and Blue C Polyester. The removal of oily soil and oily stains, which are hydrophobic, from the surfaces of such fabrics which are likewise hydrophobic in character is well recognized to be technically difficult to achieve using laundry compositions of the type most generally accessible to consumers.

It has been recognized in the art that the provision of substances which attach to the surfaces of polyester fabrics and render them more hydrophilic in character is helpful in achieving improved oily soil and oily stain release from such fabrics. Substances which have been used in consumer products as soil release agents are generally copolymers of moderately high (e.g., 40,000 to 50,000) molecular weight, containing ethylene terephthalate segments randomly interspersed with polyethylene glycol segments. See, for example, U.S. Pat. No. 3,962,152, Nicol et al, issued June 8, 1976; a soil release polyester of this type, commercially known as Milease T®, is further disclosed in U.S. Pat. No. 4,116,885, Derstadt et al, issued Sept. 7, 1978; other commercial variants are Permalose® and Zelcon® (see Canadian Pat. No. 1,100,262, Baker et al, issued May 5, 1981 and U.S. Pat. No. 4,238,531, Rudy et al, issued Dec. 9, 1980).

The development of new soil release agents delivering technically outstanding soil release performance cost-effectively in consumer laundering and fabric care compositions is not straightforward. To be particularly useful, efficient adsorption and surface coverage of polyester fabric surfaces by the soil release agent must occur with minimum interference from the product matrix which is being used as a vehicle to convey the soil release agent to the fabric surface. Matrix interferences, when they occur, not only decrease the effectiveness of the soil release agent, but also reduce the cleaning, softening and/or antistatic benefits of other ingredients which may also be present in the product. Formulability of the soil release agent is also a major consideration, since the limited solubility and/or dispersibility of art-taught polyesters frequently imposes serious constraints on the range of formulations into which the soil release agent may stably be introduced. Such challenges are generally absent from compositions used in industrial textile treatments, but are well-known to manufacturers of fully-formulated consumer products.

Soil release agents which satisfy these criteria in various consumer laundering and fabric care compositions,

particularly home laundry compositions which contain anionic surfactants, would be highly desirable.

It is an object of the present invention to provide novel anionic-capped oligomeric esters having one and two anionic capping groups.

It is a further object to provide compositions for use as soil release agents in consumer laundering and fabric care compositions, said compositions comprising anionic-capped oligomeric esters of the present invention or mixtures thereof.

These and other objects are secured herein, as will be seen from the following disclosure.

BACKGROUND ART

A. Soil Release Finishes

Handbook of Fiber Science and Technology, Marcel Dekker, New York, NY, 1984, Volume II, Part B, Chapter 3 entitled "Soil Release Finishes", is a recent review of soil release agents. Almost all of the soil release agents, including anionic soil release agents, reviewed appear to find application principally outside the laundry detergent context, e.g., in industrial textile treatment. The anionic soil release agents reviewed are generally polyacrylates rather than polyesters, and contain ionizable carboxylate groups.

B. Polyester Chemistry

"*Polyesters and their Applications*", Bjorksten et al, Reinhold, 1956, reviews the older and well-established art of polyester synthesis, with particular emphasis on higher molecular weight polyesters used to form fibers or shaped articles.

C. Polyester Backbones

Ponnusamy et al, *Makromol. Chem.* 184, 1279-1284 (1983), discloses a recent synthesis and characterization of copolyesters of ethylene glycol, 1,2-propylene glycol, or mixtures thereof, with dimethyl terephthalate. Molecular weights of the products range from 4000-6000.

D. Capping Reagents and Capped Polyesters

U.S. Pat. No. 3,823,185, Schlossman, issued July 9, 1974, discloses the synthesis of $H(OCH_2CH_2)_nSO_3Z$ ($Z=H$ or Na). Derivatives having $n=4, 5$ and 9 were isolated. Synthesis route was via ethoxylation of sodium isethionate.

Japanese Patent Documents JP 47/35311 and JP 47/35312, Kobayashi et al, published Sept. 5, 1972, disclose modification of polyester fibers for improved dyeability using poly(ethylene glycol)sulfoethyl ether alkali metal salts, e.g., $HO(CH_2CH_2O)_nCH_2CH_2SO_3M$ ($M=Na$ or K). The molecular weight of the reagent was either 544 or 640.

U.S. Pat. No. 4,525,524, Tung et al, issued June 25, 1985, discloses polyester compositions having an increased affinity for water-based systems. The polyesters incorporate salts of organic sulfonic acid monomers and are carboxyl terminated to a substantial degree.

E. Ethylene terephthalate/PEG terephthalate soil release polyesters used in laundry detergent compositions

U.S. Pat. No. 4,116,885, Derstadt et al, issued Sept. 26, 1978, discloses laundry detergent compositions containing 0.15 to 25% (most preferably 0.5 to 10%) of an ethylene terephthalate/PEG terephthalate soil release